IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: MCCARTHY Serial No.: 09/654,718 Filed: September 5, 2000 Title: Method for Coordinating Information Flow Between Components	Group Art Unit: 2151 Examiner: George L. Opie Docket: RZMI-P520 CERTIFICATE OF MAILING I hereby certify that this correspondence is being deposited with the US Postal Service as First Class Mail in a postage-paid envelope addressed to the Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313 on April 5, 2005. Signed: /David C. Ashby/ David C. Ashby

APPEAL BRIEF

Commissioner for Patents

Dear Sir:

In response to the Final Office Action mailed October 5, 2004, Applicant submitted a Notice of Appeal on January 5, 2005. The following Appeal Brief is submitted within the statutory time of Two Months with a One Month extension of time. Applicant requests that the fees for the Appeal Brief ($250.00) and extension of time ($60.00) along with any deficits and credits be referenced to Deposit Account No. 502284 order RZMI-P520-US.

REAL PARTY IN INTEREST

Raza Microelectronics, Inc. is the assignee of the subject patent application.

RELATED APPEALS AND INTERFERENCES

None.

STATUS OF CLAIMS

Claims 1-13 and 26-37 were rejected in the Final Office Action mailed October 5, 2004. The pending claims are attached hereto as an Appendix.

STATUS OF AMENDMENTS

Claims 1-25 were filed in the original application. An Amendment was filed July 8, 2004 amending claims 1-13, canceling claims 14-25 and adding claims 26-37. The final rejection was mailed October 5, 2004. A Notice of Appeal was filed January 5, 2005. No Amendments are pending.

SUMMARY OF INVENTION

The invention pertains to the filed of coordinating the flow of data between components of an integrated system, particularly multi-step protocols used by systems with multiple functional units.

Conventional techniques of data flow within an integrated system are limited by bus-based interconnections and bus contention using arbitration mechanisms. These conventional designs lead to inherently inefficient data flow.

The invention is directed to an efficient technique that moves data transfer scheduling decisions from such individual components to one or more centralized scheduling processors. Scheduling decisions are made in advance by the processors and then communicated to the participating components using a transactions protocol. The transaction protocol allows the scheduling processor to create chained sequences of transfers. The elements of each chained sequence can then be performed by the individual components without additional communication with the scheduling processor. Advantages of the invention include improved data flow within the integrated system, which can also lead to faster data processing.

ISSUES

1. Whether the Examiner has met the burden of proving that claims 4-11 are obvious in view of Tulpule (USP 4,980,824) under 35 USC §103.

2. Whether the Examiner has met the burden of proving that claims 1-3, 12-13 and 26-37 are obvious in view of Tulpule and Rechtschaffen (USP 5,408,658) under 35 USC §103.

GROUPING OF CLAIMS

1. Claims 4-11 stand or fall together.

2. Claims 1-3 stand or fall together.

3. Claims 12-13 and stand or fall together.

4. Claims 26-28 stand or fall together.

5. Claims 29-37 stand or fall together.

ARGUMENT

In the Office Action mailed October 5, 2004, claims 1-13 and 26-37 were rejected. Claims 4-11 were rejected under 35 USC §103 in view of Tulpule. Claims 1-3, 12-13 and 26-37 were rejected under 35 USC §103 in view of Tulpule (USP 4980824) and Rechtschaffen (USP 5408658).

Prior Art Rejections

A rejection under 35 USC §103 requires that the combined references suggest the claimed combination. (MPEP 706 and 2141 et seq.).

Under the Graham test, three factors must be evaluated: the scope and content of the prior art; the differences between the prior art and the claimed invention; and the level or ordinary skill in the art. (MPEP 706 and 2141 et seq.).

GROUP 1 (Claims 4-11)

Claims 4-11 were rejected under §103 in view of Tulpule.

The present invention is directed to an efficient technique for use in a system having a plurality of components and a communication medium. The invention moves the decisions about the scheduling of transfers from individual components with an arbitration mechanism to one or more centralized scheduling processors. Scheduling decisions are made in advance by the processors and then communicated to the participating components using a transaction protocol. The transaction protocol allows the scheduling processor to create chained sequences of transfers. The elements of each chained sequence can then be performed by the individual components without additional communication with the scheduling processor.

Tulpule is directed to a technique for breaking up tasks originally designed for one processor for execution on a plurality of signal processors. Tulpule creates a dependency table on which the processors rely to complete their respective tasks. Tulpule does not teach or suggest any technique for managing multiple components over a communication medium.

Claim 4 is directed to a method of controlling system operation between a plurality of components coupled to at least one communication medium. Claim 4 requires the following:

said scheduler sending a first command to a first component to transfer data over said communication medium;

said scheduler sending a second command to a second component to transfer data over said communication medium;

notifying said second component upon completion of said first command;

initiating execution of said second command upon completion of said notifying step.

Tulpule does not teach or suggest sending commands to components to selectively perform data transfers over a communication medium. Moreover, Tulpule does note teach or suggest a technique for notifying a second component when the first component has completed its transfer.

Claims 5-6 depend from claim 4 and further recite aspect of the ordering technique which, in combination with claim 4, is not taught or suggested by Tulpule

Claim 7 depends from claim 6 and further recites that a microprocessor execute a program which, in combination with claim 6, is not taught or suggested by Tulpule.

Claim 8 recited features similar to that of claim 4, including steps of:

receiving a first command from said scheduler by a first component to transfer data over said communication medium;

receiving a second command from said scheduler by a second component to transfer data over said communication medium;

performing said first command;

notifying said second component upon completion of said performing step; and initiating said second command upon completion of said notifying step.

Tulpule does not teach or suggest sending commands to components to selectively perform data transfers over a communication medium. Moreover, Tulpule does note teach or suggest a technique for notifying a second component when the first component has completed its transfer.

Claims 9-10 depend from claim 8 and further recite aspect of the ordering technique which, in combination with claim 8, is not taught or suggested by Tulpule

Claim 11 depends from claim 10 and further recites that a microprocessor execute a program which, in combination with claim 8, is not taught or suggested by Tulpule.

Given the ordinary skill in the art of a computer engineer, it would not be obvious to develop the claimed invention in view of the Tulpule reference. For example, Tulpule does not teach or suggest sending commands to components to selectively perform data transfers over a communication medium, and skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall. Moreover, Tulpule does note teach or suggest a technique for notifying a second component when the first component has completed its transfer, and likewise, skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall.

Applicant asserts that the Examiner has not met the burden of proof that the invention is obvious in view of the cited reference. Consequently, Applicant requests that the Board overturn the Examiner's rejection with respect to Group 1.

GROUP 2 (Claims 1-3)

Claims 1-3 were rejected under §103 in view of Tulpule and Rechtschaffen.

Tulpule is directed to a technique for breaking up tasks originally designed for one processor for execution on a plurality of signal processors. Tulpule creates a dependency table on which the processors rely to complete their respective tasks. Tulpule does not teach or suggest any technique for managing multiple components over a communication medium.

Rechtschaffen is directed to a technique for a self-scheduling parallel processing computer. Rechtschaffen's goal is to partition a software program to execute several portions of the computer program in parallel, while giving the appearance that the program has been executed sequentially. Rechtschaffen provides a "method of distributing the instructions of an execution sequence among a plurality of processing elements for execution in parallel. A pseudo-schedule of the instructions is created having the same number of partitions as the number of processing elements, each of the instructions being assigned to a particular partition of the pseudo-schedule. Each of the instructions is assigned a particular decode time based upon the anticipated availability times of needed input values for that instruction. Each instruction receives a partition assignment based not only upon the decode time assigned to that instruction but also the assigned decode times of all prior instructions in the execution sequence (all prior instructions in the execution sequence being assigned a decode time and partition ahead of any later instructions in the execution sequence). The instructions assigned to the same partition are then distributed to the same processing element for execution, but without any of said decode times used to form the pseudo-schedule." (col. 3 lines 36-56). The Examiner references Rechtschaffen's Z-Mode technique (col. 5 lines 1-33) that describes multiple elements using common memory registers. Rechtschaffen's Z-Mode technique of using common memory registers is not the same as the claimed invention set forth below.

Claim 1 is directed to a method and requires a scheduling processor that initiates a transfer by sending a transfer command to a first component. The method includes transferring the data from the first component to a second component, and then the second component notifies a third component following the transfer step. The method requires that the transfer command identify the second and third components.

Both Tulpule and Rechtschaffen are significantly different than the presently claimed invention. Neither Tulpule nor Rechtschaffen teach or suggest a transfer command that identifies other components in the manner required by claim 1. Rather, Tulpule employs a dependency table on which the processors rely to complete their respective tasks. Rechtschaffen employs a partition technique and states that "instructions assigned to the same partition are then distributed to the same processing element for execution, but without any of said decode times used to form the pseudo-schedule."

The Examiner's allegation that Rechtschaffen's Z-Mode technique is somehow the same as the claimed transfer command is incorrect. Rechtschaffen does not teach or suggest sending a transfer command to a first component, transferring data from the first component to a second component and then notifying a third component upon completion, where the transfer command identifies both the second and third components. Rather, Rechtschaffen described a common memory utilization technique. For these reasons, Applicant asserts that the references do not fairly teach or suggest the invention set forth in claim 1.

Claim 2 requires all the limitation of claim 1 and further initiating another transfer by a fourth component to a fifth component. Similar to claim 1, the transfer command includes the identity of the fifth and sixth components.

For the same reasons set forth above with respect to claim 1, Applicant asserts that neither Tulpule nor Rechtschaffen teach or suggest a transfer command that identifies other components in the manner required by claim 2.

Claim 3 requires all the limitation of claim 2 and further that a microprocessor execute the program code. For the same reasons set forth above with respect to claims 1 and 2, Applicant asserts that neither Tulpule nor Rechtschaffen teach or suggest the limitations of claim 3.

Given the ordinary skill in the art of a computer engineer, it would not be obvious to develop the claimed invention in view of the Tulpule and Rechtschaffen references. For example, neither Tulpule nor Rechtschaffen teach or suggest a transfer command that identifies other components in the manner required by the claims. The references do not teach or suggest the claimed invention and skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall.

Applicant asserts that the Examiner has not met the burden of proof that the invention is obvious in view of the cited references. Consequently, Applicant requests that the Board overturn the Examiner's rejection with respect to Group 2.

GROUP 3 (Claims 12-13)

Claims 12-13 were rejected under §103 in view of Tulpule and Rechtschaffen.

Claim 12 is directed to a method of controlling a system including a plurality of components coupled to at least one communication medium and at least one scheduler comprising the steps of:

said scheduler receiving transfer requests from requesting components;

said scheduler constructing a transfer command for each of said transfer requests;

said scheduler sending said transfer commands to said requesting components;

wherein said transfer command further comprises;

(a) a destination address identifying a destination component; and

(b) a notification address identifying an acknowledge component.

As described above, Both Tulpule and Rechtschaffen are significantly different than the presently claimed invention. Neither Tulpule nor Rechtschaffen teach or suggest a transfer command that comprises a destination addresses identifying a destination component and a notification address identifying an acknowledge component in the manner required by claim 12.

Claim 13 requires all the limitation of claim 12 and further that a microprocessor execute the program code. For the same reasons set forth above with respect to claim 12, Applicant asserts that neither Tulpule nor Rechtschaffen teach or suggest the limitations of claim 13.

Given the ordinary skill in the art of a computer engineer, it would not be obvious to develop the claimed invention in view of the Tulpule and Rechtschaffen references. For example, neither Tulpule nor Rechtschaffen teach or suggest a transfer command that comprises a destination addresses identifying a destination component and a notification address identifying an acknowledge component in the manner required by the claims. The references do not teach or suggest the claimed invention and skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall.

Applicant asserts that the Examiner has not met the burden of proof that the invention is obvious in view of the cited references. Consequently, Applicant requests that the Board overturn the Examiner's rejection with respect to Group 3.

GROUP 4 (Claims 26-28)

Claims 26-28 were rejected under §103 in view of Tulpule and Rechtschaffen.

Claims 26-28 are directed to a technique for deciding an order and creating a "chained sequence" of transfers.

Claim 26 depends from claim 2 and is not taught or suggested by the references for the same reasons as claim 2, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest deciding an order and creating a "chained sequence" of transfers in the manner required by claim 26.

Claim 27 depends from claim 3 and is not taught or suggested by the references for the same reasons as claim 3, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest deciding an order and creating a "chained sequence" of transfers in the manner required by claim 27.

Claim 28 depends from claim 12 and is not taught or suggested by the references for the same reasons as claim 12, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest deciding an order and creating a "chained sequence" of transfers in the manner required by claim 28.

Given the ordinary skill in the art of a computer engineer, it would not be obvious to develop the claimed invention in view of the Tulpule and Rechtschaffen references. For example, neither Tulpule nor Rechtschaffen teach or suggest deciding an order and creating a "chained sequence" of transfers in the manner required by claims. The references do not teach or suggest the claimed invention and skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall.

Applicant asserts that the Examiner has not met the burden of proof that the invention is obvious in view of the cited references. Consequently, Applicant requests that the Board overturn the Examiner's rejection with respect to Group 4.

GROUP 5 (Claims 29-37)

Claims 29-37 were rejected under §103 in view of Tulpule and Rechtschaffen.

Claims 29-37 are directed to a technique for communicating the transfer command over a first medium and performing the transfer over a second medium.

Claim 29 depends from claim 1 and is not taught or suggested by the references for the same reasons as claim 1, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Claims 30-31 depend from claim 4 and is not taught or suggested by the references for the same reasons as claim 4, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Claims 32-33 depend from claim 6 and is not taught or suggested by the references for the same reasons as claim 6, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Claim 34 depends from claim 8 and is not taught or suggested by the references for the same reasons as claim 8, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Claim 35 depends from claim 10 and is not taught or suggested by the references for the same reasons as claim 10, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Claims 36-37 depend from claim 12 and is not taught or suggested by the references for the same reasons as claim 12, and in addition, because neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer.

Given the ordinary skill in the art of a computer engineer, it would not be obvious to develop the claimed invention in view of the Tulpule and Rechtschaffen references. For example, neither Tulpule nor Rechtschaffen teach or suggest two mediums, one of which is used for a transfer command and another of which is used to perform a transfer in the manner required by claims. The references do not teach or suggest the claimed invention and skill in the art does not supply the requisite gap of knowledge needed to overcome this shortfall.

Applicant asserts that the Examiner has not met the burden of proof that the invention is obvious in view of the cited references. Consequently, Applicant requests that the Board overturn the Examiner's rejection with respect to Group 5.

Conclusion

For the reasons set forth above, Applicant requests that the Board overturn the Examiner's rejections and pass the claims to issue.

If any matters can be resolved by telephone, Applicant requests that the Patent and Trademark Office call the Applicant at the telephone number listed below.

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Respectfully submitted,

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APPENDIX

PENDING CLAIMS

1.   (previously presented) A method for scheduling communication between a plurality of
components coupled to at least one communication medium and at least one scheduling
processor comprising the steps of:

initiating a transfer by said scheduling processor sending a transfer command to a first
component;

transferring data from said first component to a second component over said
communication medium;

said second component notifying a third component upon completion of said transferring
data step;

wherein said transfer command to said first component identifies said second and said
third components.

2.   (previously presented) The method of claim 1 further comprising the steps of:

initiating another transfer by said scheduling processor sending a transfer command to a
fourth component;

transferring data from said fourth component to a fifth component;

said fifth component notifying a sixth component upon completion of said transferring
data step;

wherein said transfer command to said fourth component identifies said fifth and said
sixth components.

3.   (previously presented) The method of claim 2 wherein said components include a
microprocessor and said method further comprises the step of:
said microprocessor executing program code.

4.   (previously presented) A method of controlling system operation between a plurality of
components coupled to at least one communication medium and at least one scheduler
comprising the steps of:

said scheduler sending a first command to a first component to transfer data over said communication medium;

said scheduler sending a second command to a second component to transfer data over said communication medium;

notifying said second component upon completion of said first command;

initiating execution of said second command upon completion of said notifying step.

5. (original) The method of claim 4 wherein said sending a first command and said sending a second command step can occur in any order.

6. (previously presented) The method of claim 5 wherein said method further comprises the step of:

said scheduler deciding an order to send said first command and said second command and creating a chained sequence of transfers.

7. (previously presented) The method of claim 6 wherein said scheduler includes a microprocessor and said method further comprises the step of:

said microprocessor executing a program.

8. (previously presented) A method of controlling system operation between a plurality of components coupled to at least one communication medium and at least one scheduler comprising the steps of:

receiving a first command from said scheduler by a first component to transfer data over said communication medium;

receiving a second command from said scheduler by a second component to transfer data over said communication medium;

performing said first command;

notifying said second component upon completion of said performing step; and

initiating said second command upon completion of said notifying step.

9. (original) The method of claim 8 wherein said receiving a first command, said receiving a second command, and said performing steps can occur in any order.

10. (previously presented) The method of claim 9 further comprising the steps of:
sending said first command by said scheduler; and
sending said second command by said scheduler

11. (previously presented) The method of claim 10 wherein said scheduler includes a microprocessor and said method further comprises the step of:
said microprocessor executing a program.

12. (previously presented) A method of controlling a system including a plurality of components coupled to at least one communication medium and at least one scheduler comprising the steps of:
said scheduler receiving transfer requests from requesting components;
said scheduler constructing a transfer command for each of said transfer requests;
said scheduler sending said transfer commands to said requesting components;
wherein said transfer command further comprises;
(a) a destination address identifying a destination component; and
(b) a notification address identifying an acknowledge component.

13. (previously presented) The method of claim 12 wherein said scheduler includes a microprocessor and said method further comprises the step of:
said microprocessor executing program code.

26. (original) The method of claim 2 further comprising the steps of:
said scheduling processor deciding an order to perform said transfers; and
creating a chained sequence of said transfers.

27. (original) The method of claim 3 further comprising the steps of:
said scheduling processor deciding an order to perform said transfers; and

creating a chained sequence of said transfers.

28. (original) The method of claim 12 further comprising the steps of:

said scheduling processor deciding an order to perform said transfers; and

creating a chained sequence of said transfers.

29. (original) The method of claim 1 wherein:

said transfer command is communicated over a first medium; and

said transferring step is performed over a second medium.

30. (original) The method of claim 4 wherein:

said step of sending a first command is communicated over a first medium; and

said step of sending a second command is communicated over a second medium.

31. (original) The method of claim 4 further comprising the step of:

transferring data from said first component over a first medium; and

wherein said step of sending a first command is communicated over a second medium.

32. (original) The method of claim 6 wherein:

said step of sending a first command is communicated over a first medium; and

said step of sending a second command is communicated over a second medium.

33. (original) The method of claim 6 further comprising the step of:

transferring data from said first component over a first medium; and

wherein said step of sending a first command is communicated over a second medium.

34. (original) The method of claim 8 wherein:

said first command is communicated over a first medium; and

said step of performing said first command is performed over a second medium.

35. (original) The method of claim 10 wherein:

said first command is communicated over a first medium; and

said step of performing said first command is performed over a second medium.

36. (original) The method of claim 12 further comprising the step of:

transferring data from said requesting components over a first medium; and

wherein said step of sending said transfer commands is performed over a second medium.

37. (original) The method of claim 12 further comprising the step of:

transferring data from said requesting components over a first medium; and

wherein said step of sending said transfer commands is performed over a plurality of second mediums.